

[54] **CARTRIDGE FOR THE CARBON RIBBON OF A TYPEWRITER, CALCULATING MACHINE, ACCOUNTING MACHINE OR LIKE OFFICE MACHINES**

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[75] Inventors: **Gianpaolo Guerrini, Ivrea; Giuseppe Oddicini, Banchette, both of Italy**

[73] Assignee: **Ing. C. Olivetti & C., S.p.A., Torino, Italy**

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[30] **Foreign Application Priority Data**

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[51] **Int. Cl.** B41j 33/14

[58] **Field of Search** 197/151, 168, 175; 242/84.51 R, 84.51 A

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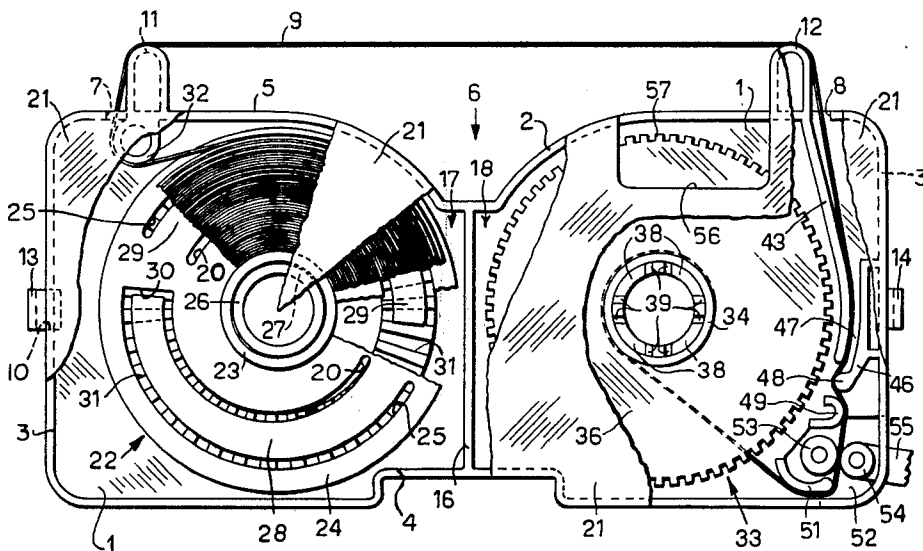
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Primary Examiner—Ernest T. Wright, Jr.
 Attorney, Agent, or Firm—I. J. Schaefer

[57] **ABSTRACT**

A cartridge for the carbon ribbon of an office machine, comprises a parallelepipedal container in which are rotatable a feed spool and a take-up spool for the carbon ribbon. The carbon ribbon passes from the feed spool out of a first aperture and back into the container through a second aperture in the container. The container has at the bottom an opening arranged in the proximity of the take-up spool and adapted to receive a pair of ribbon feed rollers mounted on the machine on which the cartridge is, in use, fitted. The container is provided with guide and friction means disposed between the take-up spool and the second aperture for frictionally conveying the carbon ribbon towards the take-up spool along a predetermined path.

6 Claims, 2 Drawing Figures



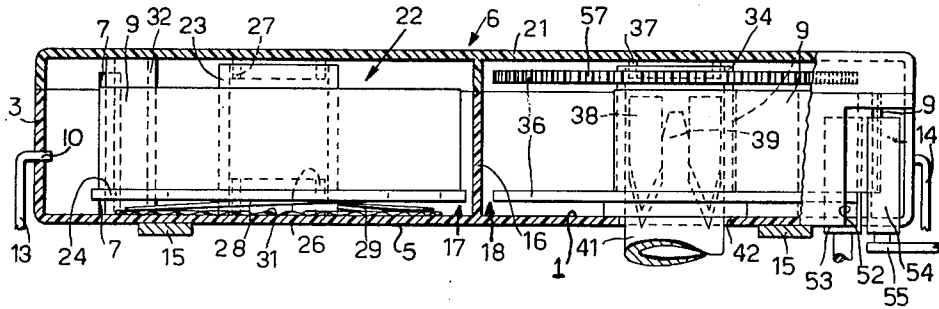


Fig. 2

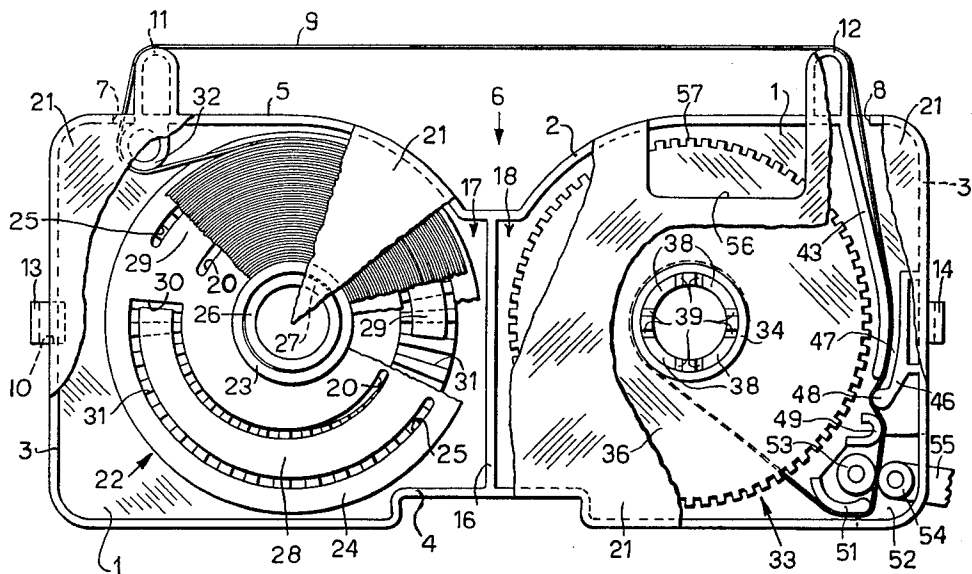


Fig. 1

CARTRIDGE FOR THE CARBON RIBBON OF A TYPEWRITER, CALCULATING MACHINE, ACCOUNTING MACHINE OR LIKE OFFICE MACHINES

BACKGROUND OF THE INVENTION

The present invention relates to a cartridge for the carbon ribbon of a typewriter, calculating machine, accounting machine or other office machines, wherein the cartridge comprises a container of substantially parallelepipedal form in which are rotatable a feed spool and a take-up spool for the ribbon, which extends outside the cartridge through a printing point, leaving and re-entering the container through two apertures in the container which are adjacent the spools.

A carbon-ribbon cartridge of the aforesaid type is known in which the carbon ribbon is unwound from the feed spool with the aid of a first driving roller carried by an arm pivoted to the machine and adjacent the feed spool. This roller is held in resilient contact with the ribbon against a pressure roller rotatably mounted in the cartridge. After the ribbon has been passed through the two apertures, it is guided over a second driving roller synchronous with the first and is collected on the take-up spool, which is rotated in turn by an independent mechanism. Owing to the presence of the pressure roller and the second driving roller in the cartridge, this cartridge is rather complicated and the cost of production is rather high. Moreover, since the first driving roller is carried by the machine and the pressure roller is carried by the cartridge, it is difficult to ensure parallelism between the two rollers. In the absence of this parallelism, the limited thickness of the carbon ribbon causes imperfect contact between the first roller and the ribbon, with the risk of breakage or of the ribbon slackening at the printing point.

There is also known another carbon-ribbon cartridge of the aforesaid type in which a driving pin for the advancing device is housed in a slot or groove in the cartridge which is radial with respect to the take-up spool. The driving pin is carried by an arm pivoted to the machine and normally bears through the action of a spring against the turns of ribbon wound on the take-up spool. Through adherence or contact, the pin causes the ribbon to advance and causes the spool to rotate at constant peripheral speed. Adherence or contact between the driving pin and the ribbon is ensured by the tension of the corresponding spring acting on the movable arm. This tension is at a minimum when only a few turns are wound on the take-up spool, which it increases with the increase in the number of wound turns owing to the pin moving away from the axis of the spool. This produces the disadvantage of inadequate adherence in the first period of use and of excessive tension in the last period of use. There may therefore be printing irregularities at the beginning of the period of use of the cartridge and risks of breaking at the end of this period.

SUMMARY OF THE INVENTION

The object of the present invention is to produce a carbon-ribbon cartridge in which the advance or feed of the ribbon can be effected by a pair of rollers, namely a driving roller and a pressure roller, of the machine, and which is of relatively low cost and which can be mounted securely and simply on the machine.

According to the present invention, there is provided a cartridge for the carbon ribbon of an office machine,

comprising a container of substantially parallelepipedal form in which are rotatable a feed spool and a take-up spool for the carbon ribbon. The carbon ribbon passing from the feed spool out of a first aperture and back into the container through a second aperture in the container, which apertures are adjacent the spools respectively, the container having at the bottom an opening arranged in the proximity of the take-up spool and adapted to receive a pair of ribbon feed rollers mounted on the machine on which the cartridge is, in use, fitted, guide and friction means being disposed between the said opening and the second aperture for checking the carbon ribbon directed to the said rollers and conveying it towards the take-up spool along a path which is independent of the amount of carbon ribbon received through the region of engagement with the rollers.

BRIEF DESCRIPTION OF THE DRAWING

A preferred embodiment of the invention is presented by way of example in the following description and shown in the accompanying drawing, in which:

FIG. 1 is a partial plan view of an inked-ribbon cartridge embodying the invention;

FIG. 2 is a front view, partly in section, of the cartridge of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1, the carbon-ribbon cartridge 6 comprises a container 5 of plastic material which is of substantially parallelepipedal form. The container 5 comprises a bottom 1, a rear wall 2, two side walls 3 and a front wall 4. The cartridge 6 has in the rear wall 2 of the container 5 two apertures 7 and 8 which are adapted to permit the passage of a carbon ribbon 9. Adjacent each of the apertures 7, 8 is a projection 11, 12 respectively, which is adapted to support a portion of the carbon ribbon 9 when the cartridge 6 is not mounted on the machine.

The container 5 is divided by a central rib 16 into two substantially equal chambers 17 and 18 and is closed at the top by a cover 21. The cartridge 6 is held fixed removably on a support 15 (FIG. 2) of the machine, for example by a pair of resilient tongues 13 and 14 which engage laterally in corresponding slots 10 in the side walls 3 of the container 5 in manner known per se.

In the chamber 17 (FIG. 1) there is housed a feed spool 22 on which is wound the carbon ribbon 9, the spool 22 being constituted by a hollow tube 23 and a bottom flange 24. The lower end of the tube 23 bears on the bottom 1 of the container 5 and the spool 22 (FIG. 2) is guided at the bottom and top by means of the tube 23 by two coaxial sleeves 26 and 27 integral with the bottom 1 of the container 5 and the cover 21 respectively.

The flange 24 is provided with two pairs of concentric slots 20 and 25 connected by two radial slots 30 of which only one is shown in FIG. 1. The slots 20, 25 and 30 define two diametrically opposed arcuate tongues 28 and 29. These tongues 28, 29 project at the bottom from the plane of the flange 24 to bear resiliently on a notched or serrated ring 31 (FIG. 1) projecting from the bottom 1 of the container 5 and having a high coefficient of friction, which prevents the spool 22 turning freely about the sleeves 26 and 27, and thus prevents slackening of the turns of the wound carbon ribbon 9.

In the chamber 17 there is moreover housed a cylindrical element 32 immediately adjacent the aperture 7 and the projection 11, for guiding the carbon ribbon 9 towards the aperture 7.

In the chamber 18 there is housed a take-up spool 33 constituted by a tube 34 (FIG. 2) and two flanges 36. The lower end of the tube 34 bears on the bottom 1 of the container 5 and the spool 33 is guided at the top by a sleeve 37 on the cover 21. The tube 34 has inside it four suitably shaped teeth 38 adapted to engage with notches 39 of inverted pyramidal form in a shaft 41 of the machine. This shaft 41 is accommodated in a hole 42 in the bottom 1 of the container 5 and forms part of a frictional rotation device for the spool 33, this device being known per se and not shown in the drawing.

In the chamber 18 (FIG. 1) there are arranged guide and friction means for the carbon ribbon 9 which comprise a pair of tongues 43 and 46 leading towards the aperture 8. The tongue 43 is connected to the rear wall 2 of the container 5 immediately adjacent the aperture 8 and has a terminal portion in the form of a circular sector with a radius slightly larger than that of the flanges 36. The tongue 46 is disposed opposite the circular portion of the tongue 43 so as to define a channel 47 through which the carbon ribbon 9 passes. The tongue 46 terminates in a cylindrical element 48 on which the carbon ribbon 9 bears. Another curved tongue 49 is disposed at the side of the cylindrical element 48 in such manner that the carbon ribbon 9 guided by the channel 47 first follows a rectilinear path and then, guided by the element 48 and by the tongue 49, follows a V-shaped path towards the front corner of the cartridge 6 adjacent the spool 33. Another curved tongue 51 also in the form of a circular sector finally guides the carbon ribbon 9 towards the spool 33. The ribbon-guiding tongues 43, 46, 49 and 51 are fixed to the bottom 1 of the container 5 and have a height substantially equal to the height of the carbon ribbon 9.

At the corner of the containers 5 adjacent the spool 33 which is opposite the aperture 8, the container 5 is provided at the bottom 1 with an opening 52 disposed in correspondence with the tongues 49 and 51. The opening 52 is adapted to receive a driving roller 53 and a pressure roller 54 mounted on a member 55 of a feed device of the machine, which device is known per se and not shown in the drawing.

The roller 53 is freely engaged at the bottom in a part of the opening 52 which is defined in the part facing the spool 33 between the tongues 49 and 51. The pressure roller 54 is urged resiliently against the roller 53 and is accommodated at the location of a break in the front wall 4 and side wall 3 of the container 5 converging towards the corner in which the opening 52 is formed. In this way, the roller 54 presses the carbon ribbon 9 against the roller 53 with a lateral movement. The carbon ribbon 9 is caused to advance or is fed in the operative position of the cartridge 6 by the rotation of the roller 53, while the take-up spool 33 is caused to rotate by the shaft 41 independent of the roller 53. During the advance of the carbon ribbon 9, the friction between the tongue 28 of the spool 22 and the ring 31 and the friction encountered by the ribbon 9 from the guide and friction means 43, 46, 48, 49, and 51 already described ensures a movement of the carbon ribbon 9 free from slackening or over-tension.

When the cartridge 6 is removed from the machine, the guide and friction means 43, 46, 48, 49 and 51 already described prevent the ribbon 9 from occupying that part of the opening 52 which is intended for the driving roller 53, allowing convenient and secure mounting of the cartridge 6 on the machine. The tongues 49 and 51, moreover, prevent contact of any possible slackened turns of the spool 33 with the roller 53 or 54.

Finally, the cartridge 6 has at the rear in the cover 21 a window 56 formed over the take-up spool 33. The window 56 permits manual rotation of a milled edge 57 of the top flange 36 for rotating the spool 33 clockwise and recovering the carbon ribbon 9, therefore placing it under tension after the cartridge 6 has been mounted on the support 15 of the machine.

We claim:

1. A carbon ribbon cartridge removably mounted on a feed device of a typewriter, calculating machine, accounting machine or other office machines including a motive shaft, a first feed roller, and a second feed roller movable from a position wherein said first and said second feed rollers are separated by a gap to another position wherein said second feed roller pinches a carbon ribbon against said feed roller for feeding said carbon ribbon,

said cartridge comprising:

a container of substantially parallelepipedal form and having a bottom portion and a top portion; a feed spool on which said carbon ribbon is normally wound;

a take-up spool for receiving said carbon ribbon; means for rotatably supporting said feed spool and said take-up spool in said container between said bottom and said top portions;

a first aperture in said container, said carbon ribbon extending through said first aperture to the exterior of said container;

a second aperture in said container, said carbon ribbon returning to the interior of said container through said second aperture, said first and said second apertures being adjacent said feed spool and said take-up spool respectively;

a third aperture in said bottom portion enabling said motive shaft to enter in said container so as to drive said take-up spool for receiving said carbon ribbon;

an opening at said bottom portion of said container, said opening being arranged in the proximity of said take-up spool so as to receive said first and said second feed rollers for pulling said carbon ribbon toward said take-up spool;

first guide means of said container disposed between said second aperture and said opening for checking said carbon ribbon from said second aperture to said opening; and

second guide means of said container disposed between said opening and said take-up spool for checking said carbon ribbon from said opening to said take-up spool so as to cause said carbon ribbon to pass over said opening along a path included on said gap.

2. A cartridge as in claim 1 wherein said top portion of said container includes a substantially flat wall, said take-up spool including an upper flange adjacent to said flat wall, and said flat wall including a window over

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said upper flange for manually rewinding said carbon ribbon on said take-up spool.

3. A cartridge according to claim 1 wherein said container includes a substantially flat wall having a notched ring, said feed spool comprising a flange adjacent to said notched ring, and said flange including a resilient tongue projecting towards said notched ring from said flange and rubbing on said notched ring to prevent undesirable rotation of said feed spool.

4. A cartridge for a carbon ribbon removably mountable on a feed device of a typewriter, calculating machine, accounting machine or other office machine including driving means and a pair of feed rollers for pulling said carbon ribbon, said cartridge comprising:

a container of substantially parallelepipedal form having a bottom part, a top part and a side part;

a feed spool fixing one end of said carbon ribbon and on which said carbon ribbon is normally wound;

a take-up spool fixing the other end of said carbon ribbon and connectable to said driving means for receiving said carbon ribbon, said feed spool and said take-up spool being rotatably supported in the interior of said container between said bottom part and said top part;

said side part including a first aperture and a second aperture, said first aperture being adjacent said feed spool and said second aperture being adjacent said take-up spool;

said bottom part including an opening adjacent said take-up spool for receiving said pair of feed rollers; said carbon ribbon extending outside said container through said first aperture and returning to the in-

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terior of said container through said second aperture; and

guide and friction means checking said carbon ribbon in the interior of said container so as to cause said carbon ribbon to be frictionally shifted by said pair of feed rollers towards said take-up spool along a path which is independent of the amount of said carbon ribbon received by said take-up spool, said guide and friction means including:

a pair of tongues adjacent said second aperture;

a cylindrical element adjacent said pair of tongues;

a first curved tongue disposed between said cylindrical element and said opening for conveying said carbon ribbon along a V-shaped path towards said opening, and

a second curved tongue for guiding said carbon ribbon from said opening towards said take-up spool.

5. A cartridge according to claim 4, wherein said first curved tongue and said second curved tongue define a portion of said opening, said portion accommodating one roller of said pair of feed rollers, said first curved tongue and said second curved tongue being shaped and positioned to prevent contact of any possible slackened length of said carbon ribbon with said one roller.

6. A cartridge according to claim 5, wherein said opening is formed in a corner of said container, said side part of said container including two walls converging towards said corner, and said two walls being interrupted to define a second portion of said opening for accommodating the other roller of said pair of rollers.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 3,877,561

DATED : April 15, 1975

INVENTOR(S) : Gian Paolo Guerrini et al

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

On the first page in "Foreign Application Priority Data" delete

"Apr. 2, 1973 and substitute --Oct. 4, 1971-- and delete "942662/73"

and substitute --70243/71--.

Signed and Sealed this
twenty-fifth Day of *November* 1975

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks